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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/695,246

Applicant(s)

KANDEL ET AL.

Examiner

David Kovacek

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply.

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/27/2003.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. **Claim 8** is objected to because of the following informalities:
 - The sixth limitation of **claim 8** contains incorrect grammar and should be corrected. The examiner suggests instead that this limitation read, "[the] controlling the gain for the amplification [to be] based on the level sensed..."
 - Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 8** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **claim 8**, the second limitation refers to, "differentially amplifying a first frequency range...and a second frequency range." This is ambiguous because it is unclear whether it is directed to the use of differential amplifiers for amplifying the first and/or second frequency range, or rather if the two frequency ranges are amplified using different means or techniques. In light of

the specification, the latter usage seems more appropriate. The examiner has selected this interpretation for the purposes of examination and application of prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 6, 8, and 10-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,506,910, listed in IDS, hereinafter referred to as Miller.

Regarding **claim 1**, Miller discloses an amplifying system, comprising:

- a first amplifying circuit to linearly amplify a first frequency range of an audio signal that substantially comprises first speech formant frequencies (Fig. 1, elements 20, 32; Fig. 3, element 30; Col. 4, lines 211-30),
- a second amplifying circuit to linearly amplify a second frequency range of the audio signal that substantially comprises second speech formant

frequencies (Fig. 1, elements 20, 32; Fig. 3, element 30; Col. 4, lines 211-30);

It is noted by the examiner that though Miller does not explicitly specify two individual amplifying circuits, this is obviously analogous to Miller's disclosure of a multiband gain control (Fig. 1, element 32; Col. 4, lines 21-24), including the potential of analog implementation of the multiband gain control. One skilled in the art at the time the invention was made would recognize such a device as a combination of amplifying circuits for amplifying different ranges of audio frequencies differently as is claimed.

- the amplification of the first frequency range and the amplification of the second frequency range to emulate at least one acoustic property of a passive device (Fig. 2; Col. 3, line 64 - Col. 4, line 10);

It is noted by the examiner that the broadest reasonable interpretation of a "passive device" according to one of ordinary skill in the art at the time of the invention would include an acoustic space such as the room in which a system operates. Miller implies the emulation of a room with a perfectly neutral frequency response (Col. 4, lines 5-6), as well as further disclosing the ability to replicate any frequency response the user desires.

- a mixer [mixer/preamplifier] to combine the first frequency range and the second frequency range into an amplified audio signal (Fig. 1, element 24; Col. 3, lines 38-39); and

- an acoustic output device [speaker system] to transmit [broadcast] the amplified audio signal [program signal] (Fig. 1, element 36; Col. 3, lines 44-45).

Regarding **claim 6**, Miller discloses a public announcement system, comprising:

- a first amplifier to linearly amplify a first frequency range of an audio signal, the first frequency range substantially of first speech formant (Fig. 1, elements 20, 32; Fig. 3, element 20; Col. 4, lines 21-30);
- a second amplifier to linearly amplify a second frequency range of the audio signal, the second frequency range substantially of second speech formant (Fig. 1, elements 20, 32; Fig. 3, element 20; Col. 4, lines 21-30);
- the amplification of the first frequency range and the amplification of the second frequency range weighted differently (Fig. 1, element 32; Col. 4, lines 21-30)
- and to emulate at least one acoustic property of a passive device (Fig. 2; Col. 3, line 64 – Col. 4, line 10);
- a mixer [mixer/preamplifier] to combine the signal amplified by the first amplifier of the first frequency range and the signal amplified by the second amplifier of

the second frequency range into an amplified audio signal (Fig. 1, element 36; Col. 4, lines 6-10); and

- an acoustic output device [speaker system] to transmit [broadcast] the amplified audio signal [program signal] (Fig. 1, element 36; Col. 3, lines 44-45).

It is noted by the examiner that this in many respects similar to **claim 1** and is largely rejected for the same reasons. It is further noted by the examiner that changes in the preamble regarding intended use are not given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

One significant difference between the claims is the slightly narrower scope required by the inclusion of the amplification of the first frequency range and the amplification of the second frequency range weighted differently in **claim 6**. However, it is further noted that Miller discloses this as well in exemplifying a number of uses for the multigain control (Col. 4, lines 06-10), some of which comprise conditions

where different frequency ranges are weighted differently [increased or decreased bass or treble].

Regarding **claim 8**, Miller discloses a method of enhancing speech [audio] in a public address system, comprising:

- receiving an audio signal (Fig. 1, elements 24, 26, 28, 30, 70; Col. 3, lines 38-42; Col. 5, line 67 – Col. 6, line 03);
- differentially amplifying a first frequency range that substantially consists of first speech formant frequencies and a second frequency range that substantially consists of second formant frequencies of the audio signal (Fig. 1, elements 20, 32; Fig. 3, element 20; Col. 4, lines 21-30);

It is noted by the examiner that though Miller does not explicitly disclose the differentiation between frequency ranges as relating directly to speech formant frequencies, the multigrain control unit is directed to the full range of human auditory frequencies, which necessarily includes ranges that comprise the frequency ranges related to the first and second formants of human speech.

- mixing an injected inaudible signal tone [masked sine wave] with the audio signal (Fig. 1, element 22; Col. 2, lines 33-38, lines 46-47; Col. 4, lines 64-67);

- sensing a level of the signal tone within the audio signal received (Fig. 1, element 42; Col. 3, lines 49-52); and
- controlling a gain for amplification of the second frequency range based on the level of the signal tone sensed (Fig. 1, element 44; Col. 3, line 67 – Col. 4, line 06);
- the controlling the gain for the amplification to be based on the level sensed (Col. 3, lines 54-60; Col. 4, lines 21-25),
- to substantially prevent regenerative oscillation [unwanted acoustic feedback/howl] of the audio signal (Fig. 3, element 62; Col. 7, lines 09-16) and
- to amplify the second formant frequencies without creating howling (Col. 3, lines 54-60; Col. 7, lines 54-60).

Regarding **claim 10**, Miller discloses or renders obvious all limitations of **claim 8** as applied above, and further discloses that the sensing of the signal tone makes use of a narrow band filter (Fig. 1, element 42; Col. 5, lines 04-11, lines 30-39).

Regarding **claim 11**, Miller discloses or renders obvious all limitations of **claim 8** as applied above, and further discloses sensing a change in at least one environmental variable (Col. 4, lines 54-60; Col. 4, line 67 - Col. 5, line 06; Col.

5, lines 39-47), and further implies the controlling the gain for the amplification is further based on the sensed change (Col. 3, line 64 – Col. 4, line 10; Col. 4, lines 54-63).

Regarding **claim 12**, Miller discloses or renders obvious all limitations of **claim 11** as applied above, and further implies that the sensed change is based on the signal tone (Col. 3, lines 54-60; Col. 3, line 64 – Col. 4, line 10).

Regarding **claim 13**, Miller discloses or renders obvious all limitations of **claim 8** as applied above, and further discloses suggests that the differentially amplifying emulates at least one acoustic property of a passive device (Fig. 2; Col. 3, lines 61-64; Col. 3, line 64 - Col. 4, line 10).

4. **Claims 2-4, 7 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of *Acoustic Systems in Biology*, hereinafter referred to as Fletcher.

Regarding **claim 2**, Miller discloses all limitations of **claim 1** as applied above, but does not disclose nor render obvious the emulation of either an ear cupping or ear trumpet.

Fletcher provides equations which predict the frequency response of a trumpet horn of known dimensions (p. 192-193), which could be used by one of ordinary skill in the art at the time the invention was made to emulate the frequency response of such a

horn (for example, an ear trumpet) using a multiband gain control method, such as is taught in Miller. The references are combinable because each deals with the analysis and adjustment of audible sound. Fletcher further provides motivation to combine in disclosing the similarities between horn shapes and the pinna in animal ears including humans (Page 178, pages 200-201). Therefore, the examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings of Fletcher to modify the teachings of Miller in order to implement an amplifying system with multiband amplification that emulates an ear trumpet for the purpose of providing a close approximation to a human ear's frequency response in the system.

Regarding **claim 3**, Miller in view of Fletcher discloses all limitations of **claim 2** as applied above, and Miller further discloses:

- a receiver to receive an input signal and to source therefrom the audio signal of the first and second frequency ranges (Fig. 1, element 40; Col. 3, lines 45-49);
- a generator to generate an injection tone (Fig. 1, element 22; Col. 2, lines 33-38, lines 46-47; Col. 4, lines 64-67);
- the mixer to combine the injection tone with the signals of the first and the second frequency ranges

amplified by the respective first and the second amplifiers (Fig. 1, element 22; Col. 3, lines 34-36); and

It is noted by the examiner that Miller does not disclose the injection tone to be combined at the mixer, but instead with a separate masked sine wave adder.

It is further noted that one of ordinary skill in the art would recognize that modifying the masked sine wave adder to act as an additional input to mixer/preamplifier 24 would produce the same results with a reasonable expectation of success. A person of ordinary skill in the art, upon reading the teachings Miller, would also have recognized the motivation to modify exists because the masked sine wave adder 22 would then be accessible to allow manual control from the user to improve performance of tone detection in unexpected conditions. Furthermore, this modification is a known option within the technical grasp of one of ordinary skill in the art at the time the invention was made.

Therefore, the examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to make this modification to the teachings of Miller in order to allow manual control of the tone injection by the user to improve performance of the tone detection in unexpected conditions with reasonable expectation of success.

- the acoustic output device to transmit the amplified audio signal of the first and the second frequency ranges together with the injection tone (Fig. 1, element 34; Col. 3, lines 42-45); and
- a detector to recover a portion of the injection tone signal feedback and received by the receiver in the input signal (Fig. 1, element 42; Col. 3, lines 49-52; Col. 5, lines 15-19);
- the second amplifier comprising an adjustable gain of a magnitude controlled dependent on the level of the injection tone signal recovered by the detector (Fig. 1, element 44; Col. 3, line 67 – Col. 4, line 06; Col. 5, lines 36-39).

Regarding **claim 4**, Miller in view of Fletcher discloses all limitations of **claim 3** as applied above, and Miller further discloses that the generator [sine wave adder] is intended to inject a tone that is not audible [masked] (Col. 4, line 65 - Col. 5, line 15).

Regarding **claim 7**, this claim is very similar to **claim 2**, in that it includes the same limitation of **claim 2** and only further differs in the preamble from the base **claims 1** and **6** as applied above. For these reasons, **claim 7** is rejected for the same reasons as applied to **claim 2**.

Regarding **claim 14**, Miller discloses or renders obvious all limitations of **claim 8** as applied above, but does not disclose nor render obvious the emulation of either an ear cupping or ear trumpet.

Fletcher provides equations which predict the frequency response of a trumpet horn of known dimensions (p. 192-193), which could be used by one of ordinary skill in the art at the time the invention was made to emulate the frequency response of such a horn (for example, an ear trumpet) using a multiband gain control method, such as is taught in Miller.

Further because **claim 8** claims subject matter very similar to that of **claim 1** and **claim 14** only provides limitations presented in **claim 2**, the motivation to combine the references with regard to **claim 2** is applicable to **claim 14**.

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of US Patent 4,539,692 hereinafter referred to as Munter.

Regarding **claim 9**, Miller discloses all limitations of **claim 8** as applied above, but does not disclose the modulation of the signal tone using at least one of pulse modulation and frequency modulation.

Munter discloses a system of automatic gain control in a voice transmission circuit, such as a telephone system, that includes an inaudible control signal using pulse modulation (Col. 4, lines 05-12, lines 21-25, lines 31-34).

The two references are combinable because each is directed to a system of transmitted and reproducing audio data with controllable gain. Munter provides motivation in disclosing the utility of identifiable pulse code modulated signals to prompt a third-party network system in order to automate the process for increased speed and accuracy (Col. 1, lines 18-25).

Therefore, the examiner contends that it would have been obvious for one of ordinary skill in the art to modify the teachings of Miller using the teachings of Munter in order to implement an automatic equalization system capable of detecting and identifying pulse code modulated signals in order to automate operation via a third-party network system.

6. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Fletcher and in further view of Munter.

Regarding **claim 5**, Miller in view of Fletcher discloses all limitations of **claim 3** as applied above, but does not adequately teach a predetermined modulation encoding or decoding for the injection tone signal.

Munter discloses a system of automatic gain control in a voice transmission circuit, such as a telephone system, that includes an inaudible control signal using pulse modulation (Col. 4, lines 05-12; lines 21-25, lines 31-34).

The three references are combinable because each is directed to a system of transmitted and reproducing audio data with controllable gain. Fletcher provides

motivation to combine in disclosing the similarities between horn shapes and the pinna in animal ears including humans (Page 178, pages 200-201). Munter further provides motivation in disclosing the utility of identifiable pulse code modulated signals to prompt a third-party network system in order to automate the process for increased speed and accuracy (Col. 1, lines 18-25).

Therefore, the examiner contends that it would have been obvious for one of ordinary skill in the art to modify the teachings of Miller in view of Fletcher using the teachings of Munter in order to implement an automatic equalization system that emulates an ear trumpet for the purpose of providing a close approximation to a human ear's frequency response that is further capable of detecting and identifying pulse code modulated signals in order to automate operation via a third-party network system.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. **Claims 8-14** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over **claims 1-8** of U.S. Patent No. 6,647,123.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

Claims 8-14 contains subject matter that is an obvious variation of subject matter already existing in **claim 1-8** of US Patent 6,647,123. The table below provides an example of the comparison between the claim language that exists between the two documents for **claims 8 and 1**.

CURRENT APPLICATION	US PATENT 6,647,123	COMPARISON
8. A method of enhancing speech intelligibility in a public address system, comprising:	1. A method of processing an audio signal in a hearing aid for increasing speech intelligibility to a human, comprising:	The preambles of each claim do not carry patentable weight because each only provides intended use without directly affecting the limitations that follow.
receiving an audio signal;	receiving an audio signal;	These limitations are identical.
differentially amplifying a first frequency range that substantially consists of first speech formant frequencies and a second frequency range that substantially consists of second formant frequencies of the audio signal;	differentially amplifying a first frequency range that substantially comprises first speech formant frequencies and a second frequency range that substantially comprises second formant frequencies of the audio signal;	The current claim is encompassed by the previous claim, as the inclusive language "substantially consists" is a qualified variation of "comprises"
mixing an injected inaudible signal tone with the audio signal;	mixing an injected inaudible signal tone with the audio signal;	These limitations are identical.
sensing a level of the signal tone within the audio signal received; and	sensing a level of presence of the signal tone; and	The current claim is encompassed by the previous claim, as "presence" is understood to mean "level of the signal tone within the audio signal received."
controlling a gain for amplification of the second frequency range based on the level of the signal tone sensed;	automatically controlling gain amplification of only the second frequency range based on the sensed level of the signal tone;	The previous claim provides a narrower scope in specifying "automatically controlling" instead of the current claim which does not specify this and thus encompasses it.
the controlling the gain for the amplification to be based on the level sensed, to substantially prevent regenerative oscillation of the audio signal and to amplify the second formant frequencies without creating howling.	the controlling the gain amplification based on the sensed level to substantially prevent regenerative oscillation of the audio signal and to amplify the second formant frequencies without creating howling.	Though not identical, these limitations are directed to the same subject matter.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Fischer (US Patent 4,332,979) teaches an electronic environmental acoustic simulator.
- Gambacurta, et al. (US Patent 4,939,782) teaches a self-compensating multiband graphic equalizer.
- Field et al. (US Patent 5,001,757) teaches an FM Tone Detector.
- Leveque (US Patent 5,095, 539) teaches a system and method of tone control using injected signal tones.
- Magotra et al. (US Patent 5,608,803) teaches a programmable digital listening system utilizing digital filters.
- Hall (US Patent 6,307,945) teaches a radio-based hearing aid system using frequency modulation methods.
- Benade (*Horns, Strings & Harmony*, Anchor Books, 1960.) teaches the elementary physics of resonant musical devices including horns.

Application/Control Number:
10/695,246
Art Unit: 2626

Page 19

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Kovacek whose telephone number is (571) 270-3135. The examiner can normally be reached on M-F 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DMK 12/12/2007


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